

## **REMARKS**

Claims 1-3, 5-17, 19-32, and 35-39 are pending. Claims 4, 18, and 33-34 are canceled.

The independent claims 1, 15 and 35 are currently amended. Support for the amendments of the claims is found in the specification in the following locations:

Support for "laminate is a composite" is found on page 6, line 19.

Support for "uretdione with an activation temperatures in excess of 300°F" is found on page 8, line 20.

Support for "adhesive having an activation temperature of approximately 55°C - 60°C" is found on page 8, lines 9-12.

Support for the "thermoplastic polyurethane resin having a Shore A Durometer greater than 88" is found on page 9, line 28.

Support for "collapsible structures" is found on page 2, line 18.

Support for "assembled into a collapsible structure by application of heat and compression" is found on page 6, line 25, which reads "the tanks are constructed by assembling", and on page 8, lines 21-22 which reads "laminates made in this fashion can be assembled using a compression press. The presses normally operate between 280-340°F and 20-45 minutes dwell times".

Independent claims 1, 15 and 35 claim a composite formed by extruding on a fabric an adhesive having an activation temperature of approximately 55°C - 60°C comprising a uretdione with an activation temperature in excess of 300°F, and a thermoplastic polyurethane having a Durometer greater than 88.

The invented composite of the system is suitably assembled into collapsible structures (i.e., fuel and water tanks) using heat and pressure, and at least two characteristics

of the system are operable which are not taught by the prior art. The system provides a flexible laminate without solvent; and the laminate is a composite that, at a subsequent time, is assembled using into collapsible structure. The structure is collapsible, in no small part due to the selection of the prescribed urethane polymers that comprise the composite. The activation temperature of the selected uretdione is relatively high, thus enabling assembly at a subsequent time. Contrast the instant invention with a solvent based material having a curing component. The presence of the solvent slows curing (i.e. extends the pot life of the coating). It is known in the art of solvent coatings that the solvent lowers the Tg, and this also enables curing to progress further at room temperature, because the polymer hasn't formed a solid matrix, which has the potential deleterious effect that as coating cures it blocks solvent in the coating. Solvent can impart taste to a coating, as it will slowly evaporate. The current claims include the use of heat and compression. There is no solvent, and as a practical matter, for collapsible tanks such as water tanks, the use of a solvent would be wholly undesirable as the solvent would linger and impart a taste to the water. The Examiner, like the Applicant, probably cannot think of a water container that is cast from a solvent-based material. This is because there is always a finite amount of residual solvent; so a dried solvent coating is not equivalent to an extruded coating for several reasons, one of which is the deleterious effect of residual solvent.

The Examiner on November 16, 2006 issued an advisory stating the amendment filed on 8/29/06 presents newly added subject matter drawn to a non-elected invention, and that the claims are hybrid claims. Applicant reminds the Examiner that original claims 2, 16 and 36 claimed "system further comprising heating panels of the heat curable extruded adhesive laminate", and no restriction was issued in first office action, nor after the response to the

first office action, where the claims continued to read on the panels. Applicant is desirous of working with the Examiner to resolve the pending issues, and has currently amended the claims, so that incontrovertibly, the hybrid issue has been addressed. The current amendment, which replaces the amendment filed on November 7, includes the phrase *where said laminate is a composite that at a subsequent time is assembled into a collapsible structure by application of heat and compression, said structure being hydrolytically stable and substantially inert following assembly.* The Examiner is requested to attach weight not only to the composition of the composite, as this is determinative of the properties prior to assembly, but also to the properties of the formed structure, as these properties are a yardstick of the utility and novelty of the claimed invention.

The Examiner states on page 2 “Applicant’s arguments with respect to the prior art rejections of claims 8-10, 12, 22-24, 26 and 29-32 are found persuasive. Specifically the prior art made of record fails to teach the claimed hydrolytic stabilizer and cross-linking enhancer”. In the subsequent rejections claims 8-10, 12, 22-24, 26 and 29-32 are conspicuously not rejected and not addressed. These claims should either be identified as allowable or rejected. Applicant believes the former status more appropriate in light of the current amendments.

The Examiner has issued a provisional double patenting rejection, stating that a terminal disclaimer has not been received. The current application is the parent of the child application 10/739361, and on February 17<sup>th</sup> of 2006 the Examiner logged in Applicant’s 10/739361 terminal disclaimer disclaiming the 10/723,145 (the instant application). A terminal disclaimer is not necessary at this time. Furthermore, 10/739361 claims a solvent

activated patch system, and this application (10/723,145) claims a laminate system comprised of extruded materials with uretdione with an activation temperature in excess of 300°F. The current application teaches how to form collapsible structures (water tanks), while the other teaches how to repair tanks with a solvent activated patch. Therefore, there doesn't appear to be a need for a terminal disclaimer. Applicant requests the Examiner to revisit the request for a terminal disclaimer.

Claims 15-16, 25, 27 and 28 stand rejected under 35 USC 102(b) as being anticipated by Morikawa et al., US patent 6,309,507. Claim 15, currently amended, comprises an extruded mixture of a thermoplastic polyurethane resin having a Shore A Durometer greater than 88, a thermoplastic polyurethane adhesive having pendant hydroxyl groups, said adhesive having an activation temperature of approximately 55°C - 60°C and comprises a uretdione with an activation temperature in excess of 300°F, wherein said extruded mixture is coated onto the fabric, thereby forming a one pass heat curable extruded adhesive laminate. Furthermore, the laminate is a composite that at a subsequent time is assembled into a collapsible structure by application of heat and compression, said structure being hydrolytically stable and substantially inert following assembly. Examiner states that Morikawa'507 teaches "As the lamination method using the laminate adhesive of this invention, there can be applied wet lamination, dry lamination, hot-melt lamination, extrusion lamination, non-solvent lamination and the like." Applicant claims in claim 15 a system, wherein a mixture is extruded on a fabric resulting in a composite. Morikawa'507 is laminating a film to another film using an adhesive. As taught in col. 10, lines 33-37 "When the film is coated with the adhesive, the coated film is, if necessary, allowed to stand as it is for a certain period of time and then laminated. Thereafter, if necessary, a pressure is applied

and a heat is applied to accelerate the curing reaction.” Applicant is not laminating films, and Applicant’s invented laminate does not require a post-cure. When curing is used by Applicant, it is to assemble a collapsible structure in a compression press. The contrasting elements are Applicant doesn’t claim a film, Morikawa’507 claims at least two films, Applicant applies a mixture of adhesive and a thermoplastic resin, and Morikawa’507 applies just an adhesive. Applicant is extruding a uretidione with an activation temperature in excess of 300°F, while Morikawa’507 teaches the use of an isocyanate that cures at 40°C (104° F) for 3 days, see col. 15, lines 45-46.

The Examiner admits that Morikawa et al. teaches the use of a solvent. Solvents are not used with a material extruded at the temperatures required to extrude the TPU adhesive and TPU resin, therein forming the composite. Morikawa et al. does not teach a uretdione having an activation temperature of in excess of 300°F. Furthermore, the organic poly-isocyanates taught by Morikawa et al. are pre-reacted with a hydrophilic polar group (col. 2, line 8). Applicant does not claim a comparable compound. The Examiner is dummying down the complexity and uniqueness of the chemistry. Morikawa’s et al. Abstract teaches “A polyisocyanate curing agent for a laminate adhesive, which comprises a hydrophilic polar group-containing polyisocyanate; a laminate adhesive excellent in heat-resistance, durability and adhesiveness to polyolefin film which adhesive comprises the above hydrophilic polar group-containing polyisocyanate and an active hydrogen-containing compound; and use of an adhesive comprising the above polyisocyanate curing agent and an active hydrogen-containing compound in film lamination” Applicant’s adhesive in claim 15 is a component of a mixture that is extruded onto fabric, and as in claims 1 and 35, the adhesive is a low melting adhesive curable adhesive that is extruded onto the fabric just prior to the application of an extruded TPU resin forming a laminate. The resulting laminate

using the claimed methods of extruding form a composite, where that laminate can subsequently be processed using pressure and heat into a collapsible structure. Morikawa et al. uses a polyisocyanate curing agent to laminate polyolefin films, which are suitable for packaging. There is no teaching by Morikawa et al. that the polyolefin film laminate comprises a fabric. The only mention of a fabric, is a throwaway reference that the adhesive can be used with adhesives for film lamination, plywood, furniture, automobile, rail road, electrical appliances, nonwoven fabrics, shoes, bag and the like (col. 9 lines 63-66). This reference doesn't mention the claimed TPU resin, nor Applicant's uretdione having an activation temperature in excess of 300°F, nor teach how the adhesive is used or applied. Also, what can we draw from the teaching of Morikawa's et al. adhesive in a rail road. Are we to infer it is applied to the cross-ties, rails, or spikes? Similar confusion surrounds the other examples that are not packaging films. Morikawa's et al. adhesive is a packaging adhesive, not a laminate that can be subsequently formed into collapsible structures. The 102 rejection is respectfully traversed, as Applicant's invention is not anticipated. Claims 25, 27 and 28 depend from claim 15, and are therefore also not anticipated, and rejection to claims 15-16, 25, 27 and 28 are traversed in light of the current amendment and the remarks.

The Examiner cites Marosi, stating that although produced by a different process, the claimed product appears to be the same or similar provided by the prior art, then the burden of proof shifts to the Applicant. Firstly, Applicant argues that the Examiner has mischaracterized the products as similar, they are not. One is a packaging film and an adhesive used to make the film, and the other invention is a composite formed by a heat curable extruded adhesive laminate system, where the composite can subsequently be assembled into a collapsible structure. The Examiner has misapplied the PTO rule. The

rule states “When the prior art discloses a product which *reasonably appears to be either identical with or only slightly different than a product claimed in a product-by-process claim*, the burden is on the applicant to present evidence from which the examiner could reasonably conclude that the claimed product is patentably distinct from the product of the prior art. In re Brown, 459 F.2d 531, 173 USPQ 685 (CCPA 1972); In re Fessman, 489 F.2d 742, 180 USPQ 323 (CCPA 1974). In re Marosi, 710 F.2d 799, 218 USPQ 195 (Fed. Cir. 1983). The operative word is “*reasonably*”. The Examiner has picked out a few elements from Morikawa et al, for instance uretdione and fabric, and neglected either the context or the use or both. In Morikawa et al the uretdione, from a laundry list of isocyanates, is pre-reacted to form the invented curing compound, and the non-woven fiber to which is applied Morikawa et al’s adhesive material has been equated to a fabric that extrusion coated with a TPU having an adhesive and a latent cure. Furthermore the rule states “*slightly different*”. The bar the Examiner is applying is “*similar*”. Applicant appreciates that there is not a bright line between the two, but the Examiner has erred in considering the two products on the whole. Furthermore, In re Thorpe, 227 USPQ 964 (Fed. Cir. 1985) - The practice and law related to product-by-process claims has developed in response to the need to enable an Applicant to claim an otherwise patentable product that resists definition by other than the process by which it is made. For this reason, even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. Once the PTO establishes a *prima facie* case that the claimed product and prior art product are identical or not patentably distinct, the burden shifts to applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of the claimed product. The Examiner has not made a *prima facie* case that the claimed product and prior art product are identical or not patentably distinct, as discussed previously. The fact

that a 103 rejection is applied to claims 1 and 35 is sufficient grounds to vacate the *prima facie* case.

Claims 1-7, 11, 13-14, 17-21 and 35-38 stand rejected under 36 U.S.C. 103(a) as being unpatentable over Ohya et al. US Patent 4,567,090 in view of Morikawa et al. US patent 6,309,507. Claim 4 is cancelled. The Examiner, discussing Applicant's arguments, states that "while Morikawa et al does not teach uretdiones in a solventless composition, Applicant is not claiming a blocked isocyanate or solventless composition." The Examiner is incorrect for the following reasons. The uretdione is a "blocked isocyanate", and this is taught in the specification on page 7, lines 10-11. Therefore, a blocked isocyanate is taught. As currently amended the claimed uretdione has an activation temperature in excess of 300°F. At this temperature the uretdione unblocks. The TPU adhesive and the TPU resin are extruded at elevated temperatures. Solvents are not used because among other issues they would vaporize in the extruder. A liquid that isn't fugitive at elevated temperatures is called a plasticizer. Ohya teaches a gas barrier vinylidene chloride (D), which has an adhesive layer on both sides (C), which has a modified polyolefin layer on both sides (B), which has a polypropylene layer on both sides (A), end up with A/B/C/D/C/B/A. Ohya does not teach a fabric, so there is no teaching of combining a fabric with an extruded TPU resin with an TPU adhesive and a uretdione, where the resulting laminate is a composite. Furthermore, if Ohya did combine the 7 layer laminate with a fabric the product, having so many layers, the laminate would be so stiff as to be useless for forming, at a subsequent time, a collapsible structure such as a collapsible water tank. The Examiner states that Applicant doesn't limit the number the number of layers, and so could have as many as 7. The Applicant does claim an order of combination of fabric, adhesive and thermoplastic resin, while Ohya teaches that the adhesive is combined to vinylidene chloride on one side

and a modified polyolefin layer on the other. The order is different, the materials are different (Applicant claims TPUs and fabric), and the physical state of the materials are different. Ohya and Morikawa et al teach a film, while Applicant claims extruded (i.e., molten) materials on a fabric. Examiner states that Ohya teaches the use of a heat resistant film laminate suitable for use in food packaging that exhibits excellent gas-barrier and adhesive properties and the capability of enduring retort treatment at high temperatures. Applicant's invention relies on the capability of being able to fuse the composite into a structure with high strength seams. The capability of enduring retort treatment at high temperatures would only be desirable after the structure was formed. Applicant does not follow the relevance of the Examiner's citation of art that is an excellent "heat resistant film laminate suitable for use in food packaging that exhibits excellent gas-barrier and adhesive properties". Heat sealing on packaged products can easily be peeled away, and is in no way comparable to forming a fused bond with 25 lbs/in peel force as claimed in claims 37-39. The tear strength of Ohya's film is probably less than the peel strength of the Applicant's invention. Certainly the strength of Morikawa examples is much less, as is discussed below.

In claims 2, 16 and 36 Applicant claims a compression press. The cited references do not teach a compression press. There is no counter part in cited art.

In claims 1 and 35, a uretdione with an activation temperature in excess of 300°F is claimed, and while Morikawa mentions uretdiones, they are only used in the context of reactive polyisocyanates, and they are consumed (col. 11, line 54) during preparation of the curing agent. Morikawa does not teach that uretdiones can be used as blocked isocyanates in a solventless composition. Morikawa teaches that his cure system cures at 40° C in just three days. Neither Ohya nor Morikawa teach a laminate with a thermoplastic polyurethane resin layer. Furthermore, in claims 2, 3 & 38; 16, 17, and 39; 36 & 37, at least a portion the

(composite) laminate is heated to a temperature from about 260°F to about 350°F in a compression press, thereby forming collapsible tanks. The compression press fuses the portions, activates the latent cure, the combination forming high strength seams that retain their strength even after being immersed in water at 160°F for six weeks. Neither Ohya nor Morikawa teach anything remotely similar. Neither Ohya nor Morikawa teach an adhesive having medium to a high level of crystallinity. As a rule it is undesirable for an adhesive to have a high level of crystallinity, because when the Tg is high, the adhesive is hard. Hard adhesives can be very poor adhesives, because they do not wet the substrate they are adhering. In the intended application, during the compression and heating, the fabric, the TPU adhesive, and the TPU resin fuse into substantially a single material that is a composite, with the cured adhesive distributed in the TPU resin. The resulting material is flexible. With regard to claim 5 and the Examiner's position that crystallinity is inherent in the polyurethane taught by the prior art, and that hydroxyl groups have a medium crystallinity, the Applicant has no knowledge of this correlation. Other factors dominate. For instance, Morikawa teaches the use polyoxyalkylene ether polyols. If the polyoxyalkylene ether polyol is based on ethylene oxide, then there is a lot of crystallinity, if the polyoxyalkylene ether polyol is based on propylene oxide then there is almost no crystallinity. The two polyols have the same number of hydroxyl groups, but in the case of the propylene oxide based polyol, the methyl group prevents crystallization, while there is no methyl group to prevent crystallization of the polyethylene oxide polyol. If the Examiner is giving Official Notice, then the Examiner must state so, otherwise the Examiner is merely expressing his / her opinion, which, while it might be accurate for sugars and starches, is inaccurate for thermoplastic polyurethanes.

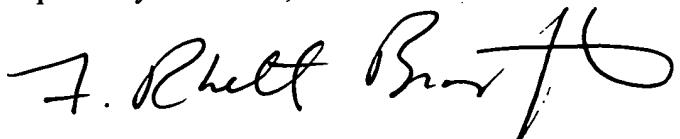
With regard to claims 37, 38 and 39, the Examiner admits that the prior art does not teach the level of performance of the seams formed after heating, but opines it is reasonable to expect that the claimed performance would be present in the heat resistant laminate formed by the prior art. The Applicant contends that Examiner has reached a conclusion not supported by the referenced prior art. The prior art teaches laminates that are substantially cured upon completion of the lamination process or followed by a low temperature cure over several days. There is no second step of compression and heating, which fuses one portion or panel of the laminate to another portion or panel. The second step kicks off the uretdione latent thermal cure and enables the adhesive and the thermoplastic resin to melt, flow and fuse, and permitting the portions of the laminate to move into contact (overlap), therein forming fabric reinforced seams. Furthermore, Ohya nor Morikawa teach the use of urethanes to bond essentially dissimilar films. For instance, in Ohya, the urethane adhesive (C) is used to bond a polyolefin adhesive layer (B) to a copolymer of vinylidene chloride layer (D). In Morikawa, the urethane adhesive is used to bond a PET layer to an aluminum foil. Morikawa teaches that the cure is at 40° C (104° F) for three days. Contrast these conditions against Applicants cure conditions of 260° F to about 350° F, while under compression, as claimed in claims 2, 16 and 36. Morikawa attains bond strengths in Table 4 of 1200 grams force /15 mm. This is about 4.4 lbs/in. Applicant attains bond strengths of 25 lbs/in, after being immersed in water and /or fuel at 160° F for six weeks. Clearly, Applicant has attained superior properties that are not taught by the prior art. The rejections of claims 1-7, 11, 13-14, 17-21 and 35-38 are respectfully traversed.

Claims 29 and 30 are not rejected. The Examiner admits that there is no teaching by the reference to N,N,N',N'-tetrakis(2-hydroxyethyl)adipamide or N,N,N',N'-tetrakis(2-hydroxypropyl)adipamide. These claims should have been identified as allowable.

There are no new claims or fees.

Examiner is encouraged to please either allow the amended claims as drafted, or identify what is allowable. In view of the foregoing amendment and these remarks, this application is now believed to be in condition for allowance and such favorable action is respectfully requested on behalf of the Applicant.

Respectfully submitted,



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